CLAIMS:

WHAT IS CLAIMED IS:

1. A method of communicating over multiple sub-channels of a wireless local area network comprising:

sending a control message that is not combined with a data message from a first network entity to a second network entity, said control message to facilitate sequencing of wireless transmissions among at least two entities in a wireless network;

receiving the control message at the second network entity and obtaining channel state information CSI from the received control message;

using the CSI to determine that a capacity of a first sub-channel of the wireless network is greater than a capacity of a second sub-channel of the wireless network;

dividing a data message to be sent into at least a first data message segment defining a first data segment size and a second data message segment defining a smaller second data segment size, said first and second data segment sizes based on the relative capacities of the first and second sub-channels; and

in response to receiving the control message, sending from the second network entity the first data message segment over the first sub-channel, and the second data message segment over the second sub-channel.

2. The method of claim 1 wherein said CSI is valid until at least the data message is sent in its entirety.

3. The method of claim 1 wherein the control message is a clear-to-send CTS message, the method further comprising, prior to sending the CTS message, the second network entity sending a request-to-send RTS message.

4. The method of claim 1 further comprising the first network entity receiving the entire data message and replying to the second network entity with an acknowledgement ACK message.

5. The method of claim 4 as executed within a contention period CP of a wireless networking architecture.

6. The method of claim 4 executed during a contention free period CFP, wherein the first network entity is a point coordinator PC of a wireless network basic service set BSS, the control message is a poll of the second network entity, the method further comprising the PC sending an acknowledgement ACK message combined with a separate data message.

7. The method of claim 6 further comprising, during the same CFP, the PC sending a poll of a third network entity, the PC failing to receive a response from the third network entity within a first time period, and the PC sending a poll of a fourth network entity within a second time period that is greater than the first time period.

8. The method of claim 4 wherein the PC responds to a data message received from a network entity with an ACK message combined with a separate control message that signals an end of a contention free period.

9. The method of claim 1 executed during a contention free period CFP, wherein the first network entity is a point coordinator PC and the control message is a first poll of the second network entity, wherein prior to sending a control message that is not combined with a data message from the PC to the second network entity, the method further comprises:

sending from the PC an initial poll that is not combined with a data message to an initial network entity;

upon the PC failing to receive a response to the initial poll from the initial network entity within a first time period, the PC sending, within a second time period that is greater than the first time period, one of:

a data message to the initial network entity and

the first poll of the second network entity.

10. The method of claim 9 wherein the first time period is less than twice the second time period.

11. The method of claim 1 executed during a contention free period CFP of a wireless networking architecture, wherein sending the data message segments comprises sending them from the second network entity to a third network entity that is not a point controller PC of the network, the method further comprising:

in response to receiving the data message segments, the third network entity sending to the second network entity an ACK message within a first time period, and

within less than twice the first time period following the ACK message from the third entity, the first station sending one of:

a poll to a network entity; and

a data message to the second network entity that is divided into third and fourth data message segments defining third and fourth segment sizes respectively, said third and fourth segment sizes based on relative capacities of sub-channels as determined by CSI that is measured from at least one data message segment sent from the second network entity to the third network entity.

12. The method of claim 1 wherein at least one of the first network entity and the second network entity is a mobile station.

13. In a method of communicating data over a wireless local area network according to an IEEE 802.11 standard, the improvement comprising:

while in a contention free period CFP, separating by at least one Short InterFrame Space SIFS a poll and a data message sent by a point controller PC.

14. In the method of claim 13, the improvement further comprising: while in a contention period CP,

measuring channel state information CSI during a Request-to-Send/Clear-to-Send RTS/CTS exchange;

parsing a data message from a station sending the RTS to a station sending the CTS into at least a first data message segment defining a first size and a second data message segment defining a smaller second size, said first and second sizes based on relative capacities of a first and second sub-channel as determined by the measured CSI, and

sending the first data message segment over the first sub-channel and the second data message segment over the second sub-channel, wherein the capacity of the first sub-channel is determined to be greater than the capacity of the second sub-channel.

15. In the method of claim 13, the improvement further comprising:

while in the CFP, the PC being restricted to sending only one of:

a poll;

a data message parsed into data segments having sizes based on relative sub-channel capacities as determined by measured CSI and transmitted among at least two sub-channels;

a data message so parsed and transmitted that is combined with an ACK message;

a CFP-End message; and

a CFP-End message that is combined with an ACK message.

16. In the method of claim 13, the improvement further comprising:

allowing the PC to send a data message without valid measured CSI to a station only upon non-receipt of a response to a poll of that same network entity within one Short InterFrame Space SIFS.

17. In the method of claim 13, the improvement further comprising:

prohibiting the PC from sending a data message without parsing the data message into segments whose relative sizes are based on relative sub-channel capacities as determined by one of valid measured CSI and estimated CSI.

18. In the method of claim 13, the improvement further comprising:

while in the CFP and following a poll from the PC to a station, allowing the polled station to send a data message prior to a time that the PC is allowed to send a data message.

19. In the method of claim 18, the improvement further comprising:

between the poll from the PC to the station and the time the PC may next transmit, allowing a polled station to send a data message to another station that is not the PC without using measured valid CSI for the channel between the polled station and the another station, and allowing the another station to reply with an ACK message to the polled station.

20. In the method of claim 13, the improvement further comprising:

while in the CFP, allowing the PC to combine a data message only with an ACK message.

21. In the method of claim 13 wherein the PC sends a poll to a mobile station, the improvement comprising:

the mobile station measuring channel state information from the poll;

the mobile station determining relative capacities of at least a first and a second sub-channel based on the CSI;

the mobile station parsing a data message to be sent into at least a first data message segment defining a first size and a second data message segment defining a smaller second size, said first and second sizes based on the determined relative capacities of the first and second sub-channels; and

the mobile station transmitting the first data segment over the first sub-channel and the second data segment over the second sub-channel when the determined capacity of the first sub-channel exceeds the determined capacity of the second sub-channel.

22. A network entity for communicating over a wireless local area network (WLAN) comprising:

a receiver for receiving over at least two sub-channels a control message from an entity of a wireless local area network WLAN;

a processor for determining a capacity of a first sub-channel and a capacity of a second sub-channel based on channel state information CSI measured from the control message;

means for parsing a data message into at least first and second segments based on the relative determined capacities of the first and second sub-channels;

a first and second antenna having inputs coupled to an output of the means for parsing, said first antenna for transmitting over the WLAN at least the first segment over the first sub-channel and said second antenna for transmitting at least the second segment over the second sub-channel.

23. The network entity of claim 22 wherein the processor is further for enabling at least the first antenna to transmit a request for the control message over the first sub-channel when said receiver fails to detect a transmission from any other network entity for a period of time at least equal to a short interframe space plus a backoff period.

24. The network entity of claim 22 wherein the network entity is a mobile station.

25. In a wireless local area network wherein a first network entity transmits to a second network entity a packet having a guard interval preceding one of a data signal and a training sequence, the improvement comprising:

the first network entity measuring channel state information CSI for the channel between the first and second network entity;

the first network entity selecting a length of the guard interval based on the CSI; and

the first network entity sending the packet with the guard interval of length selected based on CSI.

26. In the wireless local area network of claim 25, wherein the first network entity encodes the packet using a capacity enhancing code, the improvement comprising:

the first network appending to a tail end of the packet an iterative decoding signal extension.

27. In the wireless local area network of claim 26, wherein the capacity enhancing code is at least one of a low density parity check code and a turbo code.